

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
25 July 2002 (25.07.2002)

PCT

(10) International Publication Number
WO 02/057988 A2

- (51) International Patent Classification: **G06F 17/60**
- (21) International Application Number: PCT/US02/01671
- (22) International Filing Date: 18 January 2002 (18.01.2002)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/262,867 18 January 2001 (18.01.2001) US
60/291,443 16 May 2001 (16.05.2001) US
60/339,978 10 December 2001 (10.12.2001) US
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- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW); Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM); European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR); OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
— with declaration under Article 17(2)(a); without abstract; title not checked by the International Searching Authority
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD, APPARATUS AND SYSTEM FOR QUALITY PERFORMANCE EVALUATION OF A SUPPLIER BASE

(57) Abstract:

WO 02/057988 A2

METHOD, APPARATUS AND SYSTEM FOR QUALITY PERFORMANCE EVALUATION OF A SUPPLIER BASE

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CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of United States Provisional Application Nos. 60/262,867 filed January 18, 2001, 60/291,443 filed May 16, 2001, and 60/339,978 filed December 10, 2001, the disclosures of each of which are
10 incorporated herein by reference.

BACKGROUND OF THE INVENTION

This invention relates generally to a method, apparatus, and system for monitoring and analyzing the quality of performance of one or more suppliers to a
15 manufacturer of goods or services.

Over the years, manufacturers and sellers of products and services have attempted to meaningfully track, record, and evaluate quality performance information in a variety of contexts. One such context is involves the common vendor-vendee relationship, wherein one or more vendors supply goods or services to a vendee, who
20 uses such goods and services in its manufacturing operations to provide goods or services to its customers. For example, in the automotive industry, it is very common for a vehicle manufacturer (i.e., a manufacturer who sells a finished vehicle to an end user) to be supplied with goods or services from a variety of first-level suppliers. Each of those first-level suppliers, in turn, is supplied with goods or services from a
25 variety of second-level suppliers, and so on. At each level of the supply chain, it is desirable for the recipients of the goods or services (i.e., the vendees) to monitor, record, and evaluate quality performance information of the providers of such goods and services (i.e., the vendors).

Such performance information can include, for example, quantities of
30 deliveries received, timeliness of deliveries, numbers and types of defects contained in deliveries, and the like. However, it has been found to be relative difficult to collect

and assess information of this type in a manner that is optimally usable for the purpose of maintaining and increasing the quality of the goods or services that are ultimately rendered to the end user. This is true notwithstanding the advent and common use of various electronic record-keeping and monitoring systems in modern manufacturing and sales operations. In particular, it has been found to be relatively difficult and time consuming to communicate this quality performance information between the vendors and the vendees in an effective, reliable, and efficient manner. Also, it has been found to be relatively difficult and time consuming for the vendee to collect, analyze, and react to this quality performance information in an effective, reliable, and efficient manner.

Traditionally, a manufacturer who wanted to monitor the quality performance information of its suppliers would gather data from a variety of non-compatible computer databases, then manually manipulate such data so as to translate and coordinate the information into a desired format. Although effective, these efforts to manipulate, manage, and share the data across various platforms, software applications, and user groups have been very time consuming and prone to error. Both time and error frustrations are owed to the fact that the data was "handled" numerous times and by various individuals, all in an attempt to configure the data into a desired format. The interjection of multiple steps performed by multiple individuals in this process has been found to be prone to error, which can result in an incorrect assessment of the actual level of quality performance by the suppliers to the manufacturer. Additionally, such processing is relatively time consuming, resulting in an undesirable delay in the assessment of the quality performance by the suppliers to the manufacturer.

As an alternative, attempts have been made to manage and share data across various platforms, software applications, and users by requiring all of the users to adopt certain uniform practices and procedures. In other words, each of the suppliers would be required to conform their internal quality performance monitoring with the requirements of the platform, software, and users employed by the manufacturer. This solution is undesirable because it forces a multitude of suppliers to modify their current business practices to conform with those of the manufacturer. Such

conformance, while possible, can be undesirably costly. Furthermore, management and sharing systems have historically suffered from a closed architecture which is difficult to scale, enhance or customize. Thus, it would be desirable to provide a method, apparatus, and system for analyzing the quality of performance of one or more suppliers to a manufacturer of goods or services that avoids these problems.

SUMMARY OF THE INVENTION

This invention advantageously fills the aforementioned deficiency in the prior art by providing a method, apparatus, and system for the real time (or at least near real time) management and sharing of time sensitive information across a variety of platforms, software applications, and users. This invention allows for the collection and transmission of supplier performance information for the management of a supplier base to a vendor and advantageously enables vendors and vendees to communicate across non-compatible platforms and software applications in real time. The invention accomplishes this goal through the employment of the Internet (or other global communication network) that is capable of transmitting and receiving information to and from a remote location. This invention is unique in that it successfully uses a web enabled tool designed for "shop floor" statistical process control reporting, such as QualTrend (available from e-WinSPC), to combine data from diverse and non-compatible databases that are not capable of readily exchanging information in a routine and efficient manner, such as Lotus Notes and Oracle databases. Not only is the invention capable of combining data from these diverse, non-compatible databases, but it does so in a manner that allows for the virtual real time reporting of internal manufacturing and supply chain performance. The invention simultaneously takes data from a multitude of databases, some perhaps compatible and some perhaps non-compatible, and processes it using hard coded software to produce the desired evaluations in a near real time environment. The invention then reduces information processing time from days to seconds, automatically extracts existing electronic information, and publishes manipulated data through web-based technology. The efficiencies created by this invention free up resources previously engaged in data gathering, analysis, and manipulation, thereby

streamlining quality control and performance evaluation, which provides for a proactive method to initiate corrective action. Aspects of this invention are directed to a computer program and an apparatus corresponding to the method described above.

Various objects and advantages of this invention will become apparent to those skilled in the art after consideration of the detailed description is read in light of the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a system for analyzing the quality of performance of one or more vendors of goods or services to a vendee in accordance with this invention.

Fig. 2 is a more detailed block diagram of the system of this invention illustrated in Fig. 1.

Fig. 3 is a flowchart illustrating the basic steps in the method of analyzing the quality of performance of one or more vendors of goods or services to a vendee in accordance with the method of this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, there is illustrated in Fig. 1 is a block diagram of a system, indicated generally at 10, for monitoring and analyzing the quality of performance of one or more vendors of goods or services to a vendee in accordance with this invention. For the sake of illustration, this invention will be described and illustrated in the context of a single vendor-supplier that provides goods to a single vendee-manufacturer that uses such goods in its manufacturing operations to provide goods to its customers. However, it will be appreciated that the invention is not intended to be limited to this specific application and may, for example, be used to monitor and analyze the quality of performance of any number of vendors of goods or services to any number of vendees in accordance with this invention.

The system 10 includes a central controller 11 that is linked to or otherwise receives input signals from one or more input devices. The central controller 11 may, for example, be embodied as any conventional electronic computing apparatus that is

programmable to receive input signals and, in response thereto, generate output signals. In the illustrated embodiment, the input devices include a supplier information device 12, a receipts information device 13, and a defect information device 14. However, the central controller 11 may receive input signals from any
5 desired number of input devices supplying any desired nature of information. Each of the input devices 12, 13, and 14 may be embodied as any conventional electronic computing or processing device that includes an mechanism for inputting data therein, such as a keyboard, a bar code scanner, a mouse, a touch screen, a laser pen, a voice recognition system, and the like.

One of the unique features of this invention is that the various input devices 12, 13, and 14 need not be homogenous. In other words, various input devices may be used without regard to whether they are identical and without regard to compatibility. For example, the supplier information may be created, maintained, and supplied to the central controller 11 in a first format (such as the Lotus Notes format from IBM) by
15 the supplier information device 12. The receipts information may be created, maintained, and supplied to the central controller 11 in a second format (such as a conventional barcode database format from Oracle) by the receipts information device 13. The defect information may be created, maintained, and supplied to the central controller 11 in a third format (such as an internet or web-based browser software package) by the defect information device 14. In a manner that is described further
20 below, the central controller 11 is capable of extracting and translating the information that is received from each of the input devices 12, 13, and 14 into a format that can be used for subsequent processing.

The central controller 11 is responsive to the input signals generated from the
25 various input devices 12, 13, and 14 for generating output signals to one or more output devices. In the illustrated embodiment, the output devices include a display device 15 that can generate a visual display of such output signals and a report device 16 that can generate a written or other physical display of such output signals. However, the central controller 11 may generate output signals to any desired number
30 of output devices. The output devices 15 and 16 may communicate directly with the central controller 11 or may communicate indirectly by means of an intermediate

communications medium, including a *global* communications network such as the Internet, or any other communications medium. The system 10 depicted in Fig. 1 may be embodied in hardware specifically provided to implement this invention or may, alternatively, be implemented using equipment and infrastructure already in place and
5 used by the vendors and vendees.

Fig. 2 is a more detailed block diagram of the system 10 illustrated in Fig. 1. As shown therein, the central controller 11 can include a processor portion 11a and a web server portion 11b. The processor portion 11a is adapted to receive the input signals from the various input devices 12, 13, and 14 (in respective electronic tables as
10 illustrated, if desired) and, in response thereto, generate the output signals to the web server portion 11b. The information from these various input devices 12, 13, and 14 can be transferred using any conventional utility software, such as the Domino Enterprise Connecting Services (DECS) or the IBM MQ Series software. Specific part and plant information is transferred from the Oracle "Barcode" database to the
15 table in a near real time environment. The web server portion 11b is adapted to transmit the output signals over the Internet or other communications medium to the various output devices 15 and 16. If desired, the processor portion 11a and the web server portion 11b may be embodied as a separate computing devices, (for data security protection, for example), although such is not necessary.

As mentioned above, the supplier information device 12 can be embodied as any conventional electronic computing or processing device that is programmed to store and retrieve information constituting a Master Supplier List (MSL) therein. The MSL can contain information regarding each of the various vendors of goods or services to the vendee. For example, the MSL can contain name and address of each
25 vendor-supplier, the name and position of each contact person for each vendor-supplier, and other desired information. As mentioned above, the MSL may be created, maintained, and supplied to the central controller 11 in a first format (such as the Lotus Notes format from IBM) by the supplier information device 12. Individual entries in the MSL may be created and updated as desired by the supplier information
30 device 12, either manually or by any other means. Preferably, the MSL contained in

the supplier information device 12 is constantly available to the central controller 11 for the purposes described below.

The receipts information device 13 can also be embodied as any conventional electronic computing or processing device. The receipts information device 13 may, if desired, be embodied as a plurality of such devices that are located at different manufacturing locations. Ten of such individual manufacturing locations are shown in the illustrated embodiment, although this invention may be practiced with any number of such locations. As mentioned above, information regarding receipts to the vendee may be created, maintained, and supplied to the central controller 11 in a second format (such as a conventional barcode database format from Oracle) by the receipts information device 13. For example, when a shipment of parts is received at one of the manufacturing locations, a receiving clerk can quickly and easily enter the identification of parts and the quantity received by means of the barcode scanning techniques permitted by such software. Preferably, this information is transmitted to the central controller 11 in real time (or at least near real time) so that the information transmitted to the various output devices 15 and 16 is current and, therefore, most useful for the purpose of analyzing the quality of the goods or services supplied by the vendor.

The defects information device 14 may also be embodied as any conventional electronic computing or processing device. The defects information device 14 can, for example, be a conventional electronic computing device that is programmed with a conventional web browser software that can access the central controller 11 over the Internet. When a defective part is detected by the vendee, the defects information device 14 can be used to generate a Non-Conforming Material Report (NCMR) to the central controller 11. The NCMR can be embodied as an electronic document or form that prompts the vendee to provide any desired information that is relevant to identifying the defect and assisting in the elimination thereof. For example, the NCMR can request that the vendee identify the part that is defective (such as by part number), the supplier of the part, a written description of the nature of the defect, and what the disposition of the defective part was (i.e., rejected, re-worked to conformance, etc.). If desired, the NCMR can also request that the vendee attach or

append a visual representation of the defective part, such as a digital photograph, to the NCMR. The NCMRs can be stored in the either the defect information device 14 or in a local memory device of the central controller 11 for later use in a manner that will be discussed further below.

5 Fig. 3 is a flowchart illustrating the basic steps in a method, indicated generally at 30, of analyzing the quality of performance of one or more vendors of goods or services to a vendee in accordance with this invention. In a first step 31 of the method 30, the central controller 11 reads the receipts information from the receipts information device 13. This step 31 can be accomplished using the barcode scanning
10 technique described above. Thus, the central controller 11 is provided with information regarding all of the receipts of goods, preferably identified by supplier and part number.

15 In a second step 32 of the method 30, the central controller 11 reads the defect information from the defect information device 14 or from the local memory device of the central controller 11, as discussed above. This step 32 can be accomplished by reading the NCMR that was created in the manner described above. As mentioned above, the NCMR preferably includes any desired information that is relevant to identifying the defect and assisting in the elimination thereof. Preferably, an NCMR is generated whenever a defective part is detected by the manufacturer. For example,
20 if the manufacturer performs a quality inspection of the parts when received, an NCMR can be generated immediately upon delivery and inspection. On the other hand, if the defect is detected some time later when the part has reached the assembly line of the manufacturer, an NCMR can be generated at that time. In either event, it is usually important to communicate the NCMR containing the defect information to the
25 supplier for the purpose of providing contemporaneous feedback in an effort to improve quality. Thus, the central controller 11 is also provided with information regarding defects that are detected with the parts that have been received.

30 The method 30 next enters a decision point 33, wherein the central controller 11 determines whether any new NCMRs have been generated since the last time the defect information was read. If one or more new NCMRs have been generated since the last time that the defect information was read, then the method 30 branches from

the decision point 33 to a decision point 34, wherein it is determined whether the defect(s) identified in the new NCMRs are of a sufficient nature as to request some corrective action from the supplier.

In some instances, the defect may be of a relatively minor nature (i.e., missing or incorrectly applied barcode labels, for example) that, although not in conformance with the predetermined standards relating to that product, are not so non-conforming as to require any immediate corrective action on the part of the supplier. In this instance, the method 30 branches from the decision point 34 to an instruction 35, wherein the NCMR is sent to the supplier for review. As mentioned above, the communication of the NCMR containing the defect information is made to the supplier for the purpose of providing contemporaneous feedback in an effort to improve quality, even if the nature of the defect is relatively minor. Such communication can be made in any desired manner, such as by electronic mail communication over the Internet. To accomplish this, the central controller 11 can obtain the current address information of the supplier by reading information from the MSI contained in the supplier information device 12.

In other instances, however, the defect may be of a relatively major nature (i.e., improperly formed or shaped parts, for example) that are so non-conforming as to require any immediate corrective action on the part of the supplier. In this instance, the method 30 branches from the decision point 34 to an instruction 36, wherein the NCMR is sent to the supplier for review, together with a Corrective Action Request (CAR). Such communication can be made in the same manner as described above. The CAR typically requests that a Supplier Corrective Action Response (SCAR) be sent from the vendor to the vendee within a predetermined period of time. For example, a CAR may request that the vendor submit to the vendee an action plan for correcting the defect within a first predetermined period of time (twenty four hours, for example). The CAR may also request that some interim corrective action be implemented within a second predetermined period of time (one day, for example) and that a final corrective action be implemented within a third predetermined period of time (one week, for example).

If it is determined in the decision point 33 that no new NCMRs have been generated since the last time that the defect information was read, or after such new NCMRs (with or without the CARs) have been transmitted to the supplier in accordance with the instructions 35 and 36, then the method 30 enters a decision point 37, wherein it is determined whether there are any previously received NCMRs containing CARs that have not yet been responded to by the supplier. If it is determined that there are such outstanding NCMRs containing CARs, then the method branches from the decision point 37 to a decision point 38, wherein it is determined whether such outstanding NCMRs containing CARs are overdue for a response from the supplier. As mentioned above, the CAR may request that the supplier provide an action plan and actually implement corrective action within one or more predetermined periods of time. If it is determined that one or more of the outstanding NCMRs containing CARs are overdue for a response from the supplier, then the method 30 branches from the decision point 38 to an instruction 39, wherein the supplier is contacted to urge that a prompt response in the form of a SCAR be made. Such communication with the supplier can be made in the same manner as described above. If desired, the communication can be varied in accordance with the magnitude of the delay in responding (i.e., a polite first reminder, a more terse second reminder, etc.). The object of this communication is to insure that the supplier does not inadvertently forget to create a SCAR and thereafter take affirmative action to correct the defect noted in the NCMR.

If it is determined in the decision point 37 that no previously received NCMRs containing CARs that have not yet been responded to by the supplier, or if it is determined in the decision point 38 that no outstanding NCMRs containing CARs are overdue for a response from the supplier, or after a communication has been made to the supplier in accordance with the instruction 39, the method 30 enters an instruction 40, wherein the management information necessary to meaningfully track, record, and evaluate quality performance information is calculated. Such calculations can be made in any desired manner and may, for example, be based upon the receipts and defect information previously read in steps 31 and 32. A standard parts-per-million (PPM) defect rate can be calculated as the number of defective parts divided by the

number of parts received, multiplied by one million. The method 30 then enters an instruction 41, wherein the calculated information (and any other desired information) is transmitted to the web server portion 11b of the central controller 11. The web server portion 11b of the central controller 11 then makes such information available to the appropriate persons, such as over the Internet. The method 30 then returns to the first step 31 for further data collection, manipulation, and analysis in the manner described above.

The calculations discussed above can be accomplished using any conventional software. Preferably, such software is a web enabled tool designed for “shop floor” statistical process control reporting software, such as QualTrend (available from e-WinSPC). The application is designed for reporting of shop floor Statistical Process Control (SPC) data gathered manually or electronically from machine programmable logic controllers (PLC). In this invention, the statistical process control reporting software is used to process the data gathered in the common table residing on the central controller 11 to create a series of quality metrics (i.e., key performance indicators) that can be used to judge the performance of one or more suppliers. The display of the metrics can be accomplished through “hard coding” the data using proprietary software, such as the QualTrend (e-WinSPC), or other conventional software.

Typically, access to the information generated by the method 30 described above will be restricted in some manner (such as by using passwords, for example) so that sensitive business information is not available to unauthorized persons. For example, some of such information will be made available to the supplier, such as the NCMRs discussed above. However, it may be desirable to provide such quality performance information to the supplier even if there are no defects noted in the delivered parts, such as for the purpose of statistical process control and other purposes. Usually, the information that is available to each supplier will be limited to its own products that are delivered to the manufacturer. Other information can be made available to persons within the manufacturer, such as for the purpose of monitoring various quality parameters. Lastly, some information can be made available to the customer of the manufacturer, which may be interested in monitoring

the operations of the manufacturer for the purpose of improving its own internal operations. The use of a web-based platform for providing all of this information to the various parties facilitates the rapid and easy access thereto in a real time or near real time environment.

5 The PPM defect rate and number of CARs can be displayed on the display device 15 by supplier and the manufacturing plant(s) that supplier serves. The data can be presented in any desired time frame, such as yearly, quarterly, monthly, weekly, daily, hourly, or by the minute. Advantageously, the system 10 has the unique ability to “drill down” from any of the tables to the original NCMR rejection
10 document at the click of a mouse. This near real time capability makes problem identification virtually immediate and provides the opportunity for proactive initiation of corrective action.

 The various reports generated by the central controller 11 can be accessed through a customized web portal. These reports can display the PPM defect
15 information for any desired location, whether operated by the vendors, the vendees, or the customers of the vendees. Data sources can include conventional software applications and databases that existed prior to the development of this invention. Customized queries can be written to extract data from existing data sources and display the desired information by means of a conventional web browser or similar
20 software application and/or visual display means.

 The various reports can, if desired, use a color-coding scheme to facilitate the display of the performance quality information. For example, defect levels that are below a first predetermined number (less than three hundred fifty, for example) can be displayed in a first color (such as green), defect levels between the first predetermined
25 number and a second predetermined number (three hundred fifty to five hundred, for example) can be displayed in a second color (such as yellow), and defect levels that are greater than the second predetermined number (greater than above five hundred, for example) can be displayed in a third color (such as red). These ranges may be varied as desired in order to meet the needs and expectations of the various vendors and vendees using the system 10. Summary information for a particular vendor or
30 supplier can also be displayed as desired. Drill-down capabilities can be provided to

display individual suppliers and vendors across pre-determined time frames (e.g., yearly, quarterly, and weekly, for example).

Another important aspect of this invention is the ability of a user to be linked quickly and easily between the items of information that are generated to or by the central controller 11. As discussed above, the presence of a defect in a particular product will result in the generation of an NCMR, which is always communicated to the vendor. As also discussed above, the NCMR can include information identifying the part that is defective, the supplier of the part, a written description of the nature of the defect, the disposition of the defective part, and a visual representation of the defective part. For the sake of clarity, not all of these pieces of information need be presented at the same time. Rather, some of such information (the visual representation of the defective part, for example) may be linked to the NCMR such that by clicking on an icon, the user can switch directly to the other information. In some instance, the NCMR includes a CAR which requires a SCAR from the vendor. The SCARs can be similarly linked to the NCMRs such that the vendee can quickly and easily review not only the NCMRs, but also the SCARs that were generated in response thereto. Similarly, the quality performance reports that are generated by the central controller may be linked to the NCMRs and the SCARs if desired. Any of the other items of information that are generated to or by the central controller 11 can be linked together in this manner to facilitate the analysis of the quality performance information.

Other enhancements, such as (1) configuration parameters (e.g., modified color-coded cut off points, alert points), (2) standardized connections to standard quality applications and databases, (3) data entry into an additional data source for locations currently not collecting required data, (4) drill down capabilities to the individual parts and transactions that created the summary views, (5) security to allow limited access to the data, (6) reporting capabilities beyond display via a web browser, (7) ability to determine if a supplier is improving over time (i.e., showing trends and variability), (8) documentation to support installation, training, and technical support, (9) ability to generate vendor scorecards based on configurable parameters, and (10)

information about characteristics such as quality versus cost and quality versus lead-time, are contemplated to be within the scope of this invention.

In summation, this invention is directed to a method, apparatus and system for analyzing quality performance of a supplier base. The preferred embodiment of the present invention uses (1) uses information technology to merge existing, non-compatible databases; and (2) web technologies to simultaneously display information in near real time at a variety of remote locations. In so doing, the present invention reduces the time associated with the tabulation and transmission of data from days to seconds and, thereby frees up resources previously engaged in data manipulation.

In accordance with the provisions of the patent statutes, the principle and mode of operation of this invention have been explained and illustrated in its preferred embodiment. However, it must be understood that this invention may be practiced otherwise than as specifically explained and illustrated without departing from its spirit or scope.

What is claimed is:

1. A system for monitoring the quality of performance of a vendor that provides goods or services to a vendee comprising:

a receipts information device for generating a signal that is representative of a
5 quantity of the goods or services that are provided from the vendor to the vendee;

a defect information device for generating a signal that is representative of a defect in any of the goods or services that are provided from the vendor to the vendee;
and

a controller that is responsive to said signals from said receipts information
10 device and said defect information device for generating information regarding the quality of performance of the vendor, said controller being further responsive to said signals from said defect information device for generating a communication to the vendor regarding the defects.

15 2. The system defined in Claim 1 wherein said controller is responsive to defects of a first predetermined nature for generating a communication to the vendor regarding the defects and is responsive to defects of a second predetermined nature for generating a communication to the vendor regarding the defects and requesting a corrective action response.

20 3. The system defined in Claim 2 wherein said controller generates a second communication to the vendor if a corrective action response has not been made within a predetermined period of time.

25 4. The system defined in Claim 1 wherein said signal from said receipts information device is transmitted to said central controller by means of a global communications network.

30 5. The system defined in Claim 1 wherein a plurality of receipts information devices are provided for generating signals that are representative of the

quantities of the goods or services that are provided from the vendor to the vendee at a plurality of different locations.

6. The system defined in Claim 1 wherein said defect information device
5 generates a non-conforming material report (NCMR) to the controller that includes information that is relevant to identifying the defect and assisting in the elimination thereof.

7. The system defined in Claim 6 wherein said NCMR identifies the part
10 that is defective, the supplier of the part, a written description of the nature of the defect, and the disposition of the defective part.

8. The system defined in Claim 6 wherein said NCMR includes a visual
representation of the defective part.

15 9. The system defined in Claim 1 further including a supplier information device containing a Master Supplier List (MSL).

10 10. The system defined in Claim 9 wherein said MSL contains the name and address of each vendor.

11. The system defined in Claim 10 wherein said MSL further contains the
name and position of each contact person for each vendor.

25 12. The system defined in Claim 1 wherein said signal from said receipts information device and said signal from said defect information device have different formats, and wherein said controller is capable of extracting and translating said signals from said receipts information device and said defect information device into a format that can be used for subsequent processing.

13. The system defined in Claim 1 wherein said information generated by said controller regarding the quality of performance of the vendor is communicated to the vendor by means of a global communications network.

5 14. The system defined in Claim 1 wherein said information generated by said controller regarding the quality of performance of the vendor is communicated to the vendor in real time.

10 15. The system defined in Claim 1 wherein said information generated by said controller regarding the quality of performance uses a color-coding scheme to facilitate the display of the performance quality information.

15 16. The system defined in Claim 15 wherein the performance quality information includes defect levels, and wherein defect levels that are below a predetermined number are displayed in a first color and defect levels that are greater than the predetermined number are displayed in a second color.

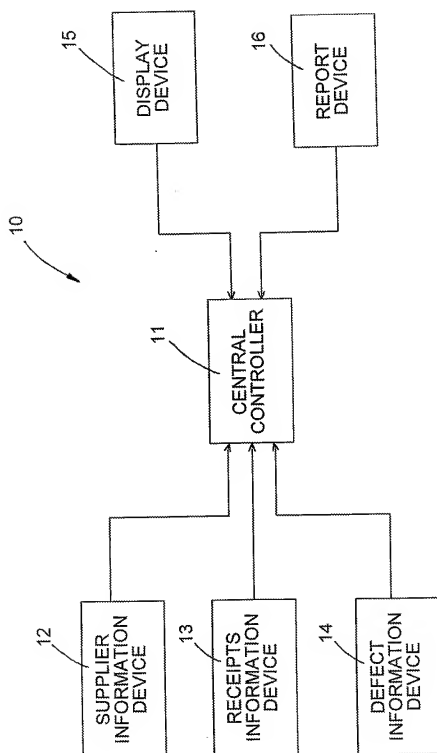


FIG. 1

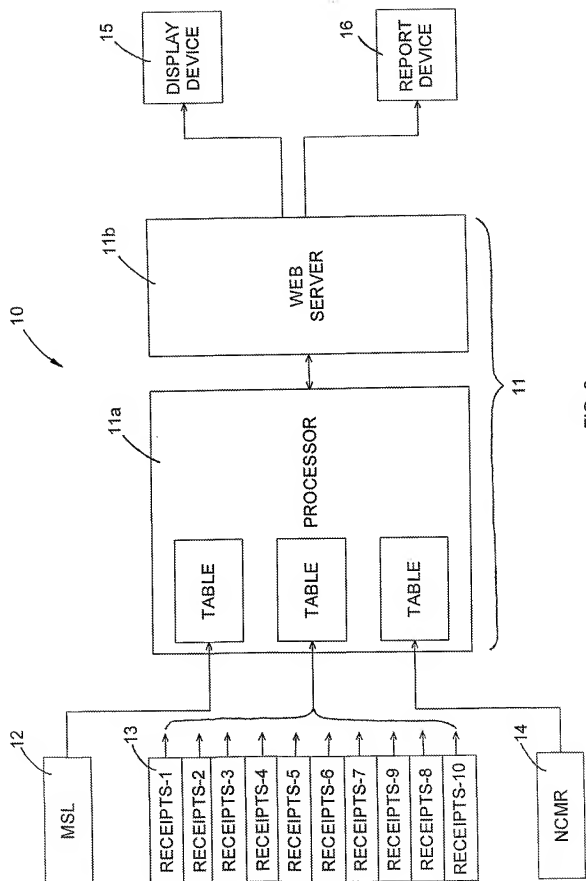


FIG. 2

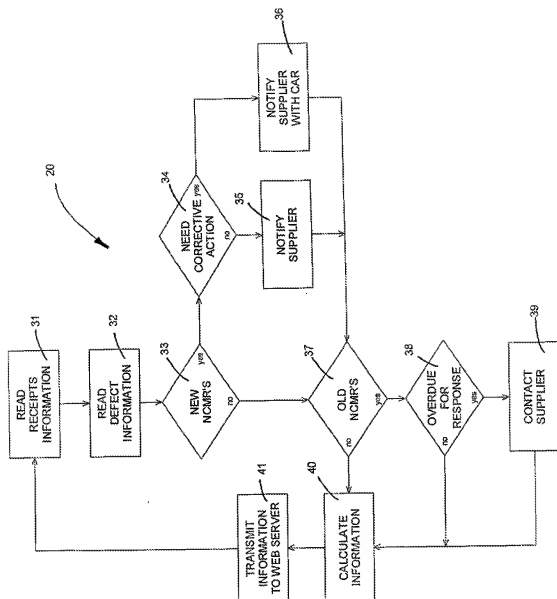


FIG. 3

PATENT COOPERATION TREATY

PCT

DECLARATION OF NON-ESTABLISHMENT OF INTERNATIONAL SEARCH REPORT

(PCT Article 17(2)(a), Rules 13ter.1(c) and Rule 39)

Applicant's or agent's file reference 53-22917	IMPORTANT DECLARATION	Date of mailing(day/month/year) 23/05/2002
International application No. PCT/US 02/ 01671	International filing date(day/month/year) 18/01/2002	(Earliest) Priority date(day/month/year) 18/01/2001
International Patent Classification (IPC) or both national classification and IPC G06F17/60		
Applicant DANA CORPORATION		

This International Searching Authority hereby declares, according to Article 17(2)(a), that **no international search report will be established** on the international application for the reasons indicated below

1. ☒ The subject matter of the international application relates to:
- a. ☐ scientific theories.
 - b. ☐ mathematical theories
 - c. ☐ plant varieties.
 - d. ☐ animal varieties.
 - e. ☐ essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes.
 - f. ☐ schemes, rules or methods of doing business.
 - g. ☐ schemes, rules or methods of performing purely mental acts.
 - h. ☐ schemes, rules or methods of playing games.
 - i. ☐ methods for treatment of the human body by surgery or therapy.
 - j. ☐ methods for treatment of the animal body by surgery or therapy.
 - k. ☐ diagnostic methods practised on the human or animal body.
 - l. ☐ mere presentations of information.
 - m. ☐ computer programs for which this International Searching Authority is not equipped to search prior art.
2. ☒ The failure of the following parts of the international application to comply with prescribed requirements prevents a meaningful search from being carried out:
- ☐ the description
 - ☒ the claims
 - ☐ the drawings
3. ☐ The failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions prevents a meaningful search from being carried out:
- ☐ the written form has not been furnished or does not comply with the standard.
 - ☐ the computer readable form has not been furnished or does not comply with the standard.
4. Further comments: See additional sheet for details.

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 203

The claims relate to subject matter for which no search is required according to Rule 39 PCT. Given that the claims are formulated in terms of such subject matter or merely specify commonplace features relating to its technological implementation, the search examiner could not establish any technical problem which might potentially have required an inventive step to overcome. Hence it was not possible to carry out a meaningful search into the state of the art (Art. 17(2)(a)(i) and (ii) PCT; see EPC Guidelines Part B Chapter VIII, 1-6).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.